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Influencing Food Choice: Effects of Stress and Sleep Deprivation on Dietary Habits of Young Adults

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INTRODUCTION

Poor dietary behavior has implications in the development of the many chronic diseases (including obesity, diabetes mellitus, cardiovascular disease, etc.) affecting our adult population today.[1] In the U.S., obesity is existent in more than one-third of adults and one-sixth of youth; these rates have not changed in any significant manner from 2003-2004 data to 2011-2012 data,[2] indicating that previous efforts to diminish this concern have had minimal success. More specifically, a study published in the *Journal of American College Health* assessed the overweight and obesity rates of college students aged 18-27 years (via BMI) and found more than 25% of this population to be overweight or obese.[3] Another study measured the height and weight of 764 college students at the beginning of their freshman year and found that that 70% of the 290 students they reassessed at the end of their sophomore year experienced significant weight gain.[4] Results of this study back the plethora of evidence suggesting young adults transitioning from high school to college are at high risk for weight gain,[5,6] as it is a time of radical changes and newfound responsibility.[7] Weight has been continually linked to poor diet and insufficient physical activity; thus, addressing the factors that lend to poor food choices at this age is vital in the successful prevention of these types of health issues. Literature indicates that sleep deprivation and stress are two important lifestyle elements that have received attention, in terms of factors affecting eating habits.

Generally speaking, college students experience elevated levels of stress at one point or another; thus, stress can be considered an important influence in this age group. Interestingly, stress is likely interrelated with the obesity endemic, as the nervous system's responses to stress directly affect hunger and energy regulation.[8] Not surprisingly, associations between high stress and altered food intake behavior have been cited in several studies of college students.[6,9] In more technical terms, stress has been found to stimulate secretion of both glucocorticoids and insulin in the body, which essentially increase the motivation for and ingestion of food, respectively.[10] In a study assessing 212 undergraduate university students, 73% of participants reported increasing their intake of "snack-type" foods during stress, whereas consumption of "meal-type" (fruit and vegetables, meat and fish) foods decreased.[11] Additionally, research published by *The Journal of American College Health* found a positive relationship between perceived stress and energy drink consumption,[12] revealing the probable relation of stress and increased caffeine and/or sugar intake. The study also found a negative correlation between academic performance and energy drink consumption, with significant differences in reported consumption between males and females. Another study, which grouped just women into "stress" and "no stress" groups and then offered them healthy (grapes) and unhealthy (M&Ms) snack options, found that women with "stress" consumed substantially more of the unhealthy snacks.[13] Conversely, men in a similar study ate more healthy snacks (peanuts & grapes) when stressed and more unhealthy snacks (chips & M&Ms) when not stressed.[14] These data suggest that food-related behaviors in response to stress differ for men and women. However, other studies have found that gender differences in food choice are insignificant.[11]

Recently, the *National Foundation of Sleep* came out with new recommendations for sleep duration as a function of age, suggesting young adults (18-25 yrs.) need seven to nine hours of sleep each night.[15] According to the National Center for Health Statistics (Healthy People 2020 research), more than 35% of individuals in the young adult age group (18-24 yrs.) have steadily reported getting "insufficient" sleep.[16] More specifically, a large study involving Midwestern college students reported that a little more than 70% of students declared getting less than eight hours of sleep each night, while 25% of students claimed getting less than six-and-a-half hours of sleep.[17] Interestingly enough, our society's growing tendency of getting less than enough sleep at night has followed a similar timeline to the relatively recent upsurge in obesity rates.[18] On a microscopic level, sleep loss has already been shown to cause the body to alter levels of orexigenic or "appetite stimulating" hormones (including leptin and ghrelin) to effectively induce an increase in appetite.[19-21] Other studies show that individuals with reduced sleep duration increase their purchase and consumption of high calorie and high fat foods.[22,23] Furthermore, a study found that daytime sleepiness of men and women correlated with increased appetite for both genders; however, only the women showed significant association between "food-specific brain responses" and self-reported overeating. Again, this suggests a difference between men and women, in terms of the association between sleep duration and food choices.

Much of the published research concerning sleep and/or stress and their associations with dietary choices has been completed in a laboratory setting. Thus, these studies acknowledged the possibility of confounded data, since participants were aware they were partaking in a study and may have behaved/responded differently as a result.[11,23,24] As such, the present study was undertaken to examine stress and sleep deprivation as influential factors of poor dietary choices of college-aged students in a more realistic setting. We hypothesized that the increased pressure and time restraints accompanying college life (especially during final exams) intensify stress levels and sleep deprivation, which, in turn, stimulate unhealthy eating habits.

METHODS

Subjects

A convenience sample of university students (n=83) was recruited from South Dakota State University to complete a cross-sectional survey. The survey was administered in the university's Student Union and participation was restricted to SDSU students only. Fifty-five participants (21 male) provided a student ID number, which allowed university-collected demographic and campus food-purchasing data to be merged with survey data. Survey data were analyzed using all 83 participant responses; questions using demographic variables and campus food-purchasing data utilized the 55 participant responses with ID. All research conducted was approved prior to the study by the university's Institutional Review Board (IRB).

Materials and Methods

An online survey was completed by students via iPad using the *QuestionPro* survey website. The survey took approximately five minutes to complete and inquired specifically about sleep duration, perceived stress, and food intake patterns and perceptions during different times of the semester (typical week vs. finals week). Perceived stress was evaluated on a scale from one to 10, with one being completely relaxed and 10 being extremely stressed out. Sleep duration was measured via time gone to bed (to go to sleep) and time woken up (to start the day). The survey questions regarding dietary habits followed a two part multiple choice design, first inquiring about the frequency of a behavior during a typical week and then asking how the frequency of that same behavior changed during finals week (increases, stays the same, and decreases). Various statement questions also followed the comparative typical week vs. finals week design; however, response options were different (strongly agree, agree, neutral,

disagree, and strongly disagree). Additionally, demographic data and food purchasing data corresponding with subset of students who provided a student ID number were obtained from the university. The demographic data included information about sex, major, age, GPA and Pell Grant eligibility (an proxy for socio-economic status), whereas the campus food-purchasing data came in the form of point-of-service data (including the food item description, as well as, the time and place of purchase).

The obtained food-purchasing point-of-service data were split into categories – entrées, snack foods/side dishes, drinks, and other. Each food item was then labeled with best-fit nutritional information obtained primarily from the food database MyFitnessPal. Nutrition data for each item included information similar to a nutritional facts label, including calories, saturated fat, sodium, cholesterol, etc. Thereafter, the American Heart Association's Recommended Nutrition Standards for Procurement of Foods and Beverages Offered in the Workplace was used to classify each food item as either "more healthy" or "less healthy." For example, if an entrée or snack food/side dish did not meet the standard's calorie, sodium, or saturated fat limits, it was systematically deemed "less healthy." Subsequently, study IDs were used to isolate the purchases made by the 55 participants who provided student ID. Data for this subset were taken from two separate weeks, one in the beginning of the semester (January 24th to 30th, 2015) and the other during finals week (May 2nd to 8th, 2015).

Student researchers administered the survey over the lunch hour for three of the five days during finals week, spring 2015. Students were entered to win a $25 Visa gift card upon completion of the survey. Those students who agreed to participate in the survey did so voluntarily. After all the surveys were completed, data were exported from *QuestionPro* into an Excel spreadsheet. The survey data for each participant was then merged with corresponding demographic and food-purchasing data.

Statistical Analysis

Data were analyzed using Stata 14 (StataCorp. 2015; College Station, TX). First, survey data were reformatted for organizational purposes. Variables were given short names, response categories were condensed, and qualitative measures were simplified. For example, the original eating habit statement questions had five response categories (1=strongly agree, 2=agree, 3=neutral, 4=disagree, and 5=strongly disagree), which were condensed into 3 response categories (1&2=agree, 3=neutral, 4&5=disagree). A similar process was used to condense the multiple choice frequency questions. Specifically, the original six response categories gauged on a per school week basis (1=never, 2=1-2 times, 3=3-4 times, 4=5-6 times, 5=7 times, and 6=more than 7 times) were condensed into 3 response categories (1=never, 2&3=sometimes, 4,5, &6=always). Furthermore, the matching bedtime and wakeup time values were used to calculate a single value of sleep duration in minutes. Thereafter, chi-squared tests were run on the eating habit questions and paired t-tests for the duration of sleep and stress level data. Subsequently, survey data were analyzed alongside demographic information via linear regression for the sleep duration and stress level questions and logistic regression for the multiple-choice questions, resulting in significant predictors ($p \leq 0.06$) for each behavior in terms of relative risk ratios.

The food purchasing data were tabulated to compare the overall proportion of "more healthy" purchases to "less healthy" purchases made during both weeks, typical and finals. From there, a chi-squared test was used to compare the proportion of "more healthy" purchases during a typical week to that of finals week to see if timing of purchase was significant. Thereafter, the food-purchasing data were analyzed alongside demographic factors via logistic regression to again test for significant demographic predictors (($p \leq 0.06$) in terms of odds ratios. In analyzing logistic regression data, the Hosmer and Lemeshow (2000) model building technique was utilized to construct a final model of significant predictors.[25]

RESULTS

Total Sample

Overall, stress scores were significantly higher during finals week compared to the rest of the semester (7.84 vs. 4.16, P<. 001; Table 1). Additionally, participants reported sleeping significantly fewer minutes on a typical weeknight during finals week compared to a typical weeknight during the rest of the semester (464.3 minutes [7.74 hrs.] vs. 508.4 minutes [8.47 hrs.], P<. 001; Table 2).

As for the dietary habit inquiries, the majority of respondents (51.9%) reported that regardless of timing during the semester (finals week vs. typical week), they were not too busy to eat healthy, while 17.7% reported they were always too busy (finals week and typical week). Furthermore, 26.6% reported they were only too busy to eat healthy during finals week. In terms of eating on the run, most respondents (46.2%) reported that regardless of timing during the semester (finals week vs. typical week), they always tend to eat on the run, while 33.8% reported they never tend to eat on the run (neither finals week nor a typical week). Fifteen percent reported they only tended to eat on the run during finals week.

Subset with Demographic and Food-Purchasing Data

General demographic information for the sample subset is provided in Table 1. The majority was female (62%) and non-Pell Grant eligible (71%) and mean age was 20.7 years.

The chi squared tests run on each of the food habit questions in the total sample showed that for each question, responses were significantly different for a typical week versus finals week. To uncover possible reasons for this difference, logistic regression was used to incorporate demographic information into the analysis to see which (if any) demographic variables played a role in the evidenced difference for finals vs. typical week responses. Refer to Table 4 for expanded data. For the initial dietary habit questions, no demographic variables were found to be significant predictors of the frequency of bringing lunch to school/work, eating “convenience” food, or drinking other caffeinated beverages during finals week. Significant predictors were found for finals week frequency of eating at a sit-down restaurant, eating at a fast-food restaurant, drinking an energy drink, and drinking a coffee drink. For the frequency of eating at a sit-down restaurant, sex was a significant predictor (p=0.039). Compared to males, females were more likely to report that eating something from a sit-down restaurant increased during finals week (RRR 0.24, p=0.039). Similarly, sex, major and age were significant predictors of eating something from a fast-food restaurant. Females were more disposed to report that eating something from a fast-food restaurant decreased during finals week (RRR 0.15, p=0.063). Paralleled with non-health majors, health-related majors were more prone to report that eating something from a fast-food restaurant decreased during finals week (RRR 0.09, p=0.050). With increased age, respondents were more inclined to report that eating something from a fast-food restaurant increased during finals week (RRR 1.65, p=0.058). Moreover, GPA was a significant predictor of energy drink consumption frequency. The higher the GPA, the more likely respondents were to report that drinking an energy drink increased during finals week (RRR 0.25, p=0.59). As for coffee drinking, sex and GPA were significant predictors (p=0.015, p=0.047). Females, as opposed to males, were more prone to report that drinking a coffee drink increased during finals week (RRR 7.98, p=0.015). Respondents with higher GPA were more inclined to report that drinking a coffee drink decreased during finals week (RRR 0.09, p=0.047).

The statement questions (agree or disagree) were also examined with demographic data to determine significant predictors. No significant predictors were found for ‘being too rushed in the morning to eat a healthy breakfast,’ ‘finding time to sit down and

eat a meal,' 'eating on the run,' or 'eating meals at about the same time every day' during finals week. Conversely, demographic predictors were found for 'being too busy to eat healthy foods,' 'not having time to think about eating healthy,' 'finding that eating healthy meals just takes too much time,' and 'thinking regular meals are important' during finals week. As GPA increased, respondents were more likely to agree with the statement "I am too busy to eat healthy foods" (RRR 0.02). The Pell Grant eligible respondents, in comparison to the non-eligible, were more prone to disagree that they didn't have time to think about eating healthy, meaning they were more likely to agree that they had time (RRR 0.19). Major (health-related vs. non-health-related), Pell Grant eligibility and GPA were all significant predictors of the response to "healthy meals just take too much time" ($p=0.039$, $p=0.004$, $p=0.043/0.048$). Health-related majors were more likely to disagree healthy meals takes too much during finals week (RRR 0.10). The Pell Grant eligible respondents were more disposed to agree that healthy meals took too much time during finals week (RRR 0.25). With increased GPA, respondents were more likely to agree or disagree (rather than to remain neutral) that healthy meals took too much time during finals week (RRR 0.05, 0.05). Again, GPA was a significant predictor, this time for response to "regular meals are important to me" ($p=0.022$). Higher GPA respondents were more inclined to disagree that regular meals were important to them.

Comprehensive tabulation of food purchases made during both weeks, typical and finals, showed that only 22% of all purchases, regardless of timing, were considered "more healthy." The chi-squared test run paralleling "more healthy" purchases during a typical week versus finals week showed no significant difference in proportions. As for demographic predictors, only sex was found to significantly predict "more healthy" purchases during both a typical week and finals week ($p=0.00$). In other words, females were more likely to purchase "more healthy" food items (OR 2.20). Isolating finals week purchases did not result in any significant difference in "more" vs. "less healthy" purchasing.

DISCUSSION

The purpose of this study was to evaluate stress and sleep deprivation as factors contributing to poor dietary choices of college-aged students. Overall, students reported a significant increase in stress and significant decrease in sleep duration during finals week, validating the initial assumption of amplified perceived stress and reduced sleep duration during finals week. Moreover, students indicated that their dietary habits (good or bad) didn't change drastically from a typical week to finals week, suggesting dietary choices are more affected by daily lifestyle and environment rather than situational stress. The corresponding food-purchasing data verified this result, as the proportion of "more" healthy purchases did not significant change from a typical week to finals week, meaning students made similar choices regardless of timing. Significant demographic predictors allowed for the pinpointing of potential reasons behind behavioral responses of interest.

Reported stress levels reaching an average of 7.84 (on a scale of 1-10) during finals week supports the postulation of high-perceived stress level during this time. Results for sleep duration followed the same trend. While the students slept significantly less during finals week (as predicted), they were still getting an average amount of 7.74 hours, which falls within the National Sleep Foundations recommendation range of seven to nine hours per night.[15]

As for the survey responses, we expected to see more responses in the 'Only during finals week' category for the 'bad' behaviors, but tended to see more than expected at either extreme (always or never). This implies that the students who have good eating habits during a typical week maintained their habits through finals week, suggesting the need for overall lifestyle changes rather than time-specific alterations. For example, interventions need not focus on increasing healthy eating habits during finals week,

rather they should focus on healthy eating while at college, and over the course of the whole semester. Demographic factors gave additional insight. Females were more likely to report an increase in eating out at a sit-down restaurant during finals week, but a *decrease* in eating out at a fast-food restaurant during finals week. This implies that women veer toward treating themselves to a nicer, sit-down meal over fast-food when eating out during stressful times. This data does not support the research that affirmed "stressed" women consumed substantially more unhealthy snacks (M&Ms) over healthy snacks (grapes)[13]; however, it does not exactly contradict it either, as we don't know what types of food they were ordering at these sit-down restaurants. Similarly, health-related majors were also more likely to report a decrease in fast-food consumption during finals week, suggesting that their knowledge in the field of health positively influences their dietary choices in times of stress. Increased GPA was correlated with an amplified consumption of energy drinks during finals week, but a reduced consumption of coffee drinks during finals week. Perhaps students with higher GPAs are selecting the energy drinks over coffee drinks because of their higher caffeine content. This is inconsistent with the research published by *The Journal of American College Health* that revealed a negative relationship between academic performance and energy drink consumption—the same study that discovered significant differences in energy drink consumption based on gender as well.[12] While our data did not reveal gender differences in energy drink consumption, it did show differences in coffee drink consumption. The fact that women were more likely to report an increase in coffee drink consumption may have ties to the theory that women tend to treat themselves during stressful times such as final exams.

Additionally, it is implied that socio-economic status is correlated with the perception of time in relation to healthy meals, as Pell Grant eligibility (an proxy for socio-economic status) was a significant predictor of whether or not the respondent thought they had time to think about eating healthy as well as actually having time for healthy meals. Pell Grant eligible respondents were inclined to agree that they had time to think about eating healthy; however, they tended to agree that healthy meals took too much time during finals week. This insinuates that, during finals week, lower socio-economic status students were aware of the time available to ponder healthy eating, but were not willing to spend the time to actually eat healthy meals. Moreover, GPA was a significant predictor of whether or not a respondent thought regular meals were important, suggesting that grades may correlate with structured time, including regular mealtimes. Looking at campus food-purchasing data, the fact that only 22% of participant purchases were classified as "more healthy" may indicate a limited availability of healthy options on campus, suggesting the university food environment is disproportionately "less healthy". However, women were twice as likely to make "more healthy" purchases, implying that healthier eating is still an alterable choice. Again and again, the data suggests lifestyle and environment as supreme moderators of healthy food choice.

LIMITATIONS

This study had its limitations. For example, the survey respondents were acquired as a convenience sample, so there is possibility of sampling bias. In essence, this just makes it more difficult generalize the study results to the entire target population. Moreover, since the survey responses were self-reported, there is a possibility of response bias, as survey participants may not have reported accurately for one reason or another. Finally, the method of tracking campus food purchases is not entirely representative of what a student may be actually eating, as students may not be eating all of their purchases or they could be purchasing most of their food off campus.

At the same time, this study had its strengths. As mentioned before, much of the published research concerning sleep and/or stress and their associations with dietary choices has been completed in a laboratory setting and therefore has the possibility of

confounded data, as participants were fully aware of partaking in the study and may have behaved/responded differently as a result. In this study, food-purchasing data were obtained directly from the university without students knowing. In other words, participating students bought food as they would normally on campus without any added pressure of knowing their purchases/eating habits were being tracked, which eliminated a limitation that is prevalent among much of the current research on this topic.

CONCLUSION

Despite stress levels and sleep differing between a typical week and finals week, dietary behaviors were generally not impacted (i.e. healthy eating during a typical week remained as such during finals week). Interventions aimed at improving young adult dietary habits should promote healthy lifestyle behaviors over the course of a semester as opposed to focusing on specific time points during the semester (i.e. finals week). Moreover, demographic factors give insight as to why certain behaviors may change over the course of the semester, indicating particular target populations for intervention (i.e. energy drink consumption/time-management interventions for high GPA students, food-related stress management intervention for females, etc.). Even though the campus food environment may not be encouraging the healthiest choices, men and women are experiencing the same environment: however, only the women are seeking out the healthier options. Hence, pursuing healthier food items is still a lifestyle choice that can be modified for the better, regardless of timing or environment.

REFERENCES

Who J, Consultation FE. Diet, nutrition and the prevention of chronic diseases. *World Health Organ Tech Rep Ser.* 2003;916(i-viii).

Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA.* 2014;311(8):806-814.

Huang TT, Harris KJ, Lee RE, Nazir N, Born W, Kaur H. Assessing overweight, obesity, diet, and physical activity in college students. *J Am Coll Health.* 2003;52(2):83-86.

Racette SB, Deusinger SS, Strube MJ, Highstein GR, Deusinger RH. Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *J Am Coll Health.* 2005;53(6):245-251.

Wengreen HJ, Moncur C. Change in diet, physical activity, and body weight among young-adults during the transition from high school to college. *Nutr J.* 2009;8:32.

Nelson MC, Kocos R, Lytle LA, Perry CL. Understanding the perceived determinants of weight-related behaviors in late adolescence: a qualitative analysis among college youth. *J Nutr Educ Behav.* 2009;41(4):287-292.

Lenz B. The transition from adolescence to young adulthood: a theoretical perspective. *The Journal of School Nursing.* 2001;17(6):300-306.

Sinha R, Jastreboff AM. Stress as a common risk factor for obesity and addiction. *Biol Psychiatry.* 2013;73(9):827-835.

Deliens T, Clarys P, De Bourdeaudhuij I, Deforche B. Determinants of eating behaviour in university students: a qualitative study using focus group discussions. *BMC Public Health.* 2014;14:53.

Dallman MF. Stress-induced obesity and the emotional nervous system. *Trends Endocrinol Metab.* 2010;21(3):159-165.

Oliver G, Wardle J. Perceived effects of stress on food choice. *Physiol Behav.* 1999;66(3):511-515.

Pettit ML, DeBarr KA. Perceived stress, energy drink consumption, and academic performance among college students. *J Am Coll Health.* 2011;59(5):335-341.

Zellner DA, Loaiza S, Gonzalez Z, et al. Food selection changes under stress. *Physiol Behav.* 2006;87(4):789-793.

Zellner DA, Saito S, Gonzalez J. The effect of stress on men's food selection. *Appetite.* 2007;49(3):696-699.

Hirshkowitz M, Whiton K, Albert SM, et al. National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health.* 2015;1(1):40-43.

Increase the proportion of adults who get sufficient sleep. *Healthy People 2020* [Internet]. http://www.healthypeople.gov/2020/data-search/Search-the-Data?nid=5261. Accessed July 7th, 2015.

Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of disturbed sleep in a large population of college students. *J Adolesc Health.* 2010;46(2):124-132.

Van Cauter E, Knutson KL. Sleep and the epidemic of obesity in children and adults. *Eur J Endocrinol.* 2008;159 Suppl 1:S59-66.

Knutson KL, Spiegel K, Penev P, Van Cauter E. The metabolic consequences of sleep deprivation. *Sleep Med Rev.* 2007;11(3):163-178.

Van Cauter E, Spiegel K, Tasali E, Leproult R. Metabolic consequences of sleep and sleep loss. *Sleep Med.* 2008;9 Suppl 1:S23-28.

Leproult R, Van Cauter E. Role of sleep and sleep loss in hormonal release and metabolism. *Endocr Dev.* 2010;17:11-21.

St-Onge MP, Roberts AL, Chen J, et al. Short sleep duration increases energy intakes but does not change energy expenditure in normal-weight individuals. *Am J Clin Nutr.* 2011;94(2):410-416.

Chapman CD, Nilsson EK, Nilsson VC, et al. Acute sleep deprivation increases food purchasing in men. *Obesity (Silver Spring).* 2013;21(12):E555-560.

Torres SJ, Nowson CA. Relationship between stress, eating behavior, and obesity. *Nutrition.* 2007;23(11-12):887-894.

Hosmer DWaL, S. . *Applied Logistic Regression.* New York: John Wiley & Sons; 2000.

Table 1. Paired t-test comparison between stress levels at the beginning of semester vs. finals week ($p<0.001$)

Stress level at the…	**n**	**Mean**	**Std. Err.**	**Std. Dev.**	**95% Conf. Interval**	
					Lower	Upper
Beginning of Semester	73	4.16	0.30	2.54	3.57	4.76
End of Semester (Finals Week)	73	7.84	0.27	2.27	7.31	8.37
Difference	73	-3.67	0.39	3.36	-4.46	-2.89

Table 2. Paired t-test comparison between sleep duration at the beginning of semester vs. finals week ($p<0.001$)

Minutes of sleep during an avg. weekday during…	**n**	**Mean**	**Std. Err.**	**Std. Dev.**	**95% Conf. Interval**	
					Lower	Upper
Beginning of Semester	60	508.4	8.4	64.7	491.7	525.1
End of Semester (Finals Week)	60	464.3	12.9	99.6	438.5	490.0
Difference	60	44.1	98.8	18.6	18.6	69.7

Table 3. Participant demographics (n=55)

Sex	Male	21
	Female	34

Major	Health	28
	Non-health	27
Pell Grant Eligibility	Yes	16
	No	39
Age (years)	Mean	20.7
	Min.	18.7
	Max.	25.1
GPA	Mean	3.36
	Min.	1.86
	Max.	4.00

Table 4. Relative Risk Ratio, 95% Confidence Interval & P-value for each final model variable, bolded values indicate a significance ($p \leq 0.06$).

	P-VALUE IF VARIABLE WAS PART OF FINAL MODEL				
	PREDICTOR				
	Sex (M/F)	**Major (Health or Non-Health)**	**Pell Grant Eligibility**	**Age**	**UG GPA**
OUTCOME **During finals week…**					
How does the frequency of days you bring lunch (or some other meal) from home to eat at work or school?					
Increases	-	-	-	-	-
Decreases	-	-	-	-	-
How does the frequency of you eating something from a sit-down restaurant change?					
Increases	**0.24** **[-2.79 – (-0.07)]** **0.039**	-	-	-	-
Decreases	0.32 [-2.56 – 0.27] 0.113	-	-	-	-
How does the frequency of you eating something from a fast food restaurant change (like McDonald's, Burger King, Hardee's, etc.) change?					
Increases	0.50 [-2.05 – 0.67] 0.322	0.51 [-2.03 – 0.69] 0.337	-	**1.65** **[-0.02 – 1.01]** **0.058**	-

Decreases	**0.15 [-3.86 – 0.10] 0.063**	**0.09 [-4.79 – 0.00] 0.050**	-	1.41 [-0.41 - 1.10] 0.372	-
How does the frequency of you eating "convenience" food, meaning pre-packaged or grab-and-go products (such as granola bars, Lunchables, etc.) change?					
Increases	-	-	-	-	-
Decreases	-	-	-	-	-
How does the frequency of you drinking an energy drink (such as Red Bull, Full Throttle, Rockstar, etc.) change?					
Increases	-	-	0.40 [-2.76 – 0.93] 0.332	-	**0.25 [-2.82 – 0.05] 0.059**
Decreases	-	-	3.77e-07 [-3574.36 – 3544.77] 0.994	-	0.18 [-5.50 – 2.12] 0.384
How does the frequency of you drinking a coffee drink (such as a mocha, espresso, etc.) change?					
Increases	**7.98 [0.40 – 3.76] 0.015**	-	-	1.49 [-0.16 – 0.96] 0.160	0.29 [-2.57 – 0.12] 0.074
Decreases	0.29 [-3.90 – 1.41] 0.357	-	-	2.27 [-0.09 – 1.73] 0.077	**0.09 [-4.86 – (-0.03)] 0.047**
How does the frequency of you drinking some other caffeinated beverage change?					
Increases	-	-	-	-	-
Decreases	-	-	-	-	-
Thinking about finals week, how strongly do you agree with the following statements?					
I am too busy to eat healthy foods.					
Agree	-	-	-	-	**0.02 [-7.35 – (-0.11)] 0.043**
Disagree	-	-	-	-	0.05 [-6.49 – 0.66] 0.110

I am too rushed in the morning to eat a healthy breakfast.					
Agree	-	-	-	-	-
Disagree	-	-	-	-	-
I don't have time to think about eating healthy.					
Agree	-	-	0.29 [-2.92 – 0.41] 0.140	-	-
Disagree	-	-	**0.19** **[-3.30 – (-0.02)]** **0.047**	-	-
Eating healthy meals just takes too much time.					
Agree	-	0.68 [-2.45 – 1.67] 0.709	0.14 [-4.25 – 0.37] 0.099	-	**0.05** **[-5.98 – (-0.10)]** **0.043**
Disagree	-	**0.10** **[-4.55 – (-0.12)]** **0.039**	**0.02** **[-6.60 – (-1.23)]** **0.004**	-	**0.05** **[-6.11 – (-0.03)]** **0.048**
It is hard to find time to sit down and eat a meal.					
Agree	-	-	-	-	-
Disagree	-	-	-	-	-
I tend to "eat on the run".					
Agree	-	-	-	-	-
Disagree	-	-	-	-	-
Regular meals are important to me.					
Agree	-	-	-	-	0.45 [-2.68 – 1.08] 0.404
Disagree	-	-	-	-	**0.05** **[-5.57 – (-0.44)]** **0.022**
I eat meals at about the same time every day.					
Agree	-	-	-	-	-
Disagree	-	-	-	-	-

Figure 1. Tend to "Eat on the Run"

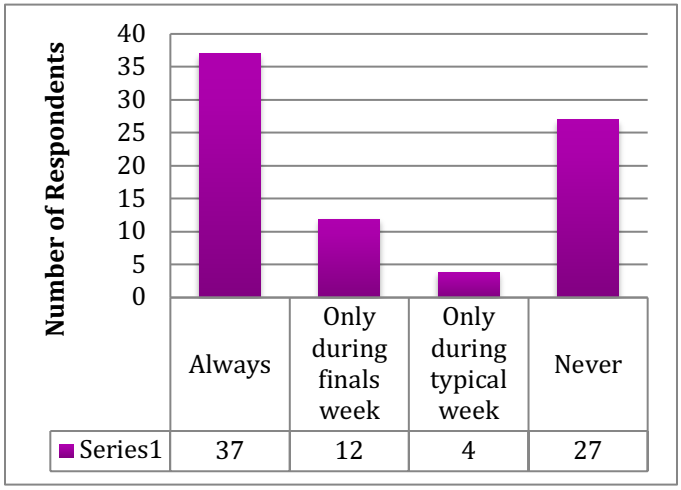

Figure 2. Too Busy to Eat Healthy